

502,466
c'd PCT/PTO 23 JUL 2004

10/502466

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 November 2003 (20.11.2003)

PCT

(10) International Publication Number
WO 03/095617 A2

(51) International Patent Classification⁷: C12N

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(21) International Application Number: PCT/US03/14286

(22) International Filing Date: 7 May 2003 (07.05.2003)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/379,507	7 May 2002 (07.05.2002)	US
60/379,712	7 May 2002 (07.05.2002)	US
60/379,618	7 May 2002 (07.05.2002)	US
60/379,555	7 May 2002 (07.05.2002)	US

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD AND APPARATUS FOR PROVIDING SIGNAL ANALYSIS OF A BIONEMS RESONATOR OR TRANSDUCER

(57) Abstract: An outputs signal, $v(t)$, is generated from a bioNEMs transducer and mixed with a reference signal and then filtered to generate a correlator output, $r(t)$. The correlator output is detected to generate a signal $u(t)$ and then determined whether the signal $u(t)$ satisfies a predetermined threshold. If qualified, it is then decided whether the signal $u(t)$ represents a predetermined type of interaction between a free ligand in a fluid in which the NEMS device is immersed and a receptor attached to the transducer. The threshold is the Neyman-Pearson criterion based on a predetermined probability of false detection, P_{fa} . The interaction may be binding of a free ligand to the receptor or releasing a bound ligand from the receptor by competitive binding with the free ligand. The step of detecting comprises detecting the envelope of the signal, $r(t)$.

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